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PROCEEDINGS of the Forest Fragmentation 2000 Conference
Concludes that private forests are nibbled to death by DUCs

Much of the unremitting movement of America's private forests toward developed uses and smaller fragments comes from **Dynamic Unintended Consequences (DUCs)** fed by common trends and policies: so concludes the just-published 389-page Proceedings of the Forest Fragmentation 2000 Conference.

The compilation of more than 50 papers presented September 17-20, 2000, in Annapolis, Maryland, features an 11-page summary of the mass of data presented regarding forest fragmentation trends, and it also includes some thoughts on what to do about it.

WHAT IS FOREST FRAGMENTATION?

Some forest fragmentation from natural events, such as storms, fires and aging, has always occurred and is even necessary for functioning forests. Some human-caused fragmentation is also unavoidable and necessary as populations change, but some is a by-product of choices and policies that stack the deck against keeping land in forest uses.

Three familiar human-caused occurrences, commonly called forest fragmentation are:

- (1) *Fragmenting ownership of a large forest tract into several smaller ownerships (also called parcelization);*
- (2) *Fragmenting the vegetation of a large expanse of forest into isolated pieces by inserting new uses and different mixtures of plants and animals;*
- (3) *Fragmenting forest uses by converting pieces of land to other uses.*

About 3 million acres (a Connecticut-size hunk of forestland) is being fragmented (split into pieces smaller than 100 acres every two years) according to one estimate that was regarded as conservative by most conference attendees. Nearly as much, around 2.4 million acres of forestland, is also being converted to developed land every two years.

SOME DUCS

(1) Fragmentation rates are increasing faster than population growth. Development-supporting economies keep expanding over the landscape, replacing forest-and-farm-supporting economies. Prior to 1992, each person added to America converted a little less than ¼ of an acre of forest to developed uses. That rate has more than doubled: each additional person causes development of about ½ an acre of forest now.

(2) A "bow wave effect" extends far in front of expanding development. It raises land prices, taxes, social and regulatory pressures that discriminate against rural land uses well before a development rush.

(3) Subsidized development demands subsidized services, which increases demand for more development... Most residential development costs government more in services than it pays in taxes.

(4) Plants and animals thriving on edge-and-disturbance effects expand; those needing large undisturbed expanses decline.

(5) Exotics and invasive weeds replace native systems. Vulnerability to insects and diseases increases. Plantings at developed sites create 67% of the invasive exotics in the U.S.

(6) Timber harvests "go terminal" in and near developed areas. One last cut is made in preparation for development; then the infrastructures and economic incentives helping keep land in forests disappear. Since this is not accompanied by a reduction in U.S. demand for forest products, imports rise, driving up harvests outside the area while local forests are unused.

WHAT'S FEEDING THE DUCS?

There are more people with more money, buying more space, and their choices are supported by transportation and communication technology and public policies.

The U.S. population is growing and so are incomes and tastes for larger houses and lots. This drives development faster than simple population growth and pushes it out into rural forests and farmlands where the unit price of construction and land is lower. Huge public investments in improved transportation systems reaching into the countryside, combined with communication technology advances have reduced the need to cluster people and businesses in concentrated urban centers and encouraged peripheral locations for businesses and households. So prosperity and freedom of choice drive some of the sprawl and fragmenting of forests, but strong public policies and market approaches encouraging development push the trends further and faster and often block solutions.

Examples

Investing in development is highly rewarded by many government policies; investing in forests is not. Studies consistently show that residential developments get more public services than they pay for while farms and forests get less. On average, farm and forest owners get only \$0.34 worth of local public services for every dollar paid in taxes. Owners of residential properties get \$1.15 worth of services for every dollar they pay in taxes.

Those who inherit valuable land are forced to subdivide it to pay high estate taxes. People who are 65 and older hold 48% of all private timberland acres, meaning that land keeps getting divided among heirs. Owners of high-value land who haven't made complex legal tax-avoidance arrangements before dying leave their heirs with the problem of being forced into selling land and timber to pay high estate taxes.

According to John Greene, a Forest Service researcher, the number and percent of estates owing federal estate tax has risen in recent years. At the same time, increased prices and urban expansion have driven up the value of both the timber and land components of forestland, pushing more land into higher brackets. Greene estimates that there are presently about 87,000 forest estate transfers annually. He projects that about 2.6 million acres of timber and 1.4 million acres of forestland is sold annually to pay estate taxes, and that at least 350,000 acres is developed annually as a result.

Markets for timber products are presently the sole monetary incentives for keeping land in private forests in most cases. Owners generally receive no payment for the other outputs coming from their forests and so have little incentive to consider them when there is an opportunity to cash in development values. Examples of valuable, but uncompensated, forest outputs are: carbon sequestration, storm water control, clean water protection, wildlife habitat, air quality improvement and a host of other benefits that go to the general public free. These have value as evidenced by the high costs of replacing them with taxpayer-financed engineered systems.

Some Values

Clean water: Forests in New York's Catskill Mountains provide clean water benefits to New York City equivalent to an initial investment of \$6-8 billion, followed by annual operating costs of \$1-2 billion for an engineered system to carry out the same service. Only recently have there been any limited payments offered to owners of these forests to encourage keeping their land undeveloped.

Handling storm water: Water retention services lost from developed forests are generally replaced (poorly) by costly-engineered systems. Tom Peterson of the Environmental Protection Agency recently estimated that extensive development in the Baltimore-Washington Chesapeake Bay watershed area had reduced average tree cover to 38% by 1997 (down from 51% in 1973). He estimates that the tree losses increased storm-water control costs for the area by \$1.08 billion.

Solutions?

(1) Change government policies that favor development while discriminating against holding land in private forests. This includes changing estate tax rules that are likely to force more sales of inherited forests as values go up.

(2) Create market-based approaches that pay owners for environmental values produced by their forests. Encouraging private owners to produce these values is likely to be cheaper than publicly financed, engineered replacements: see clean water/storm water above.

(3) Expand other innovative approaches, such as the forest bank program and easements.

(4) Examine the cost and effectiveness of public purchase and regulatory programs in comparison to private owners being encouraged to maintain forestland through fair taxation and market forces.

Proceedings can be ordered for \$50 per copy for conference attendees; \$75 per copy for non-attendees. Order from: The Sampson Group, Inc., 5209 York Road, Alexandria, VA 22310
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PowerPoint presentations of many fragmentation papers can be viewed at www.vale.edu/YFF/

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